We claim:

1. An apparatus for generating ozone and/or monovalent oxygen by the chemical conversion of an input gas comprising

a housing defining a cavity therein,

a fluid flow passage disposed in said cavity, said fluid flow passage being electrically insulated from said housing,

at least one electrode disposed in said fluid flow passage, said electrode being selected from a metal mesh and a substrate comprising a plurality of discharge point sources,

a power source for supplying an AC voltage, said power source including a contact lead electrically coupled to each said at least one electrode, and a ground lead in electrical contact with ground,

a gas inlet extending through said housing and providing gaseous fluid communication with a first portion of said flow passage upstream from said electrode,

a gas outlet passage extending through said housing and providing gaseous fluid communication with a second portion of said flow passage spaced downstream from said electrode.

2. The apparatus as claimed in claim 1 wherein said power source supplies said AC voltage as a generally square pulse high voltage waveform.

3. The apparatus as claimed in claim 2 wherein said apparatus is further operable to produce monovalent oxygen, said power source including a supply high voltage generator and circuitry for said AC voltage at a frequency selected at about a third harmonic of the resonant frequency of said high voltage generator.

4. The apparatus as claimed in claim 2 further including a cooling mechanism for supplying cooling fluid to at least part of said housing during operation of said apparatus, said cooling mechanism being selected to cool said housing to a temperature of between about 5°C and 10°C.

5. The apparatus of claim 1 wherein said electrode comprises a multipoint stainless steel mesh sheet which has been folded or welded into a plurality of substantially overlapping layers.

6. The apparatus of claim 1 wherein said housing comprises a metal housing, and said ground lead is provided in electrical contact with said metal housing.

7. The apparatus of claim 1 wherein said fluid flow passage comprises a generally serpentinely extending passage including a plurality of passage segments, each said passage segment having one of said electrodes disposed therein.

8. The apparatus as claimed in claim 7 wherein said passage segments are delineated from each other by a thermally conductive electrically insulating member spanning at least half way across a lateral width of said cavity.

9. The apparatus as claim in claim 7 wherein the electrode in each said segment is spaced in the direction of said fluid flow passage from a next adjacent electrode.

10. The apparatus as claimed in claim 9 including an insulating spacer for electrically insulating said fluid flow passage from said housing.

11. The apparatus as claimed in claim 9 further comprising a fluid pump for supplying fluid into said fluid flow passage through said fluid inlet, said fluid pump selected to supply a predetermined volume of fluid to said fluid flow passage as a continuous batch process.

12. The apparatus as claimed in claim 11 wherein said fluid pump is selected to supply said fluid to said fluid flow passage at a flow rate of between about 1 and 10 litres/minute.

13. An apparatus for producing ozone and monovalent oxygen

a metal housing defining a cavity therein,

a fluid flow passage disposed in said cavity, said fluid flow passage being electrically insulated from said housing,

a plurality of electrodes disposed in said fluid flow passage and being spaced in a direction of said flow passage from each other, said electrodes comprising a multipoint surface electrode,

a generator element for producing a pulsed AC voltage including an electrical contact electrically coupled to each of said electrodes, and a ground electrode physically separated from said electrodes to form a gap therebetween,

a fluid inlet extending through said housing and providing gaseous fluid communication with an upstream end portion of said flow passage,

a fluid outlet passage extending through said housing and providing gaseous fluid communication with a downstream end portion of said flow passage spaced flow,

a fluid supply for supplying a fluid through said fluid inlet into said fluid passage and outwardly therefrom through said fluid outlet.

14. The apparatus as claimed in claim 13 further including a cooling mechanism for supplying cooling fluid to at least part of said housing during operation.

15. The apparatus as claimed in claim 13 wherein said fluid flow passage comprises a generally serpentinely extending passage comprising a plurality of passage segments, each passage segment having at least one of said electrodes disposed therein, and

wherein said passage segments are delineated from each other by an electrical insulator.

16. The apparatus as claimed in claim 15 wherein each of said electrodes comprises a stainless steel mesh sheet which has been folded into at least three substantially overlapping layers, and

wherein the electrode in each said segment is spaced in the direction of fluid flow from a next adjacent electrode.

17. The apparatus as claimed in claim 13 wherein said fluid pump is selected to supply a predetermined volume of said fluid to said passage as a continuously process.

18. The apparatus as claimed in claim 13 wherein said fluid pump is selected to supply said fluid at a continuous flow rate of between about 1 and 10 litres/minute.

19. An apparatus for generating ozone comprising

a metal housing defining a cavity therein,

a generally serpentinely extending fluid flow passage disposed in said cavity, said fluid flow passage being electrically insulated from said housing and comprising a plurality of passage segments,

a metal mesh electrode selected from the group consisting of stainless steel mesh and platinum mesh disposed in each of said passage segments,

a power source for supplying a pulsed voltage including a lead wire electrically coupled to each said at least one electrode, and a ground wire in electrical contact with said housing,

a fluid inlet extending through said housing and providing gaseous fluid communication with a first portion of said flow passage upstream from said electrodes,

a fluid outlet passage extending through said housing and providing gaseous fluid communication with a second portion of said flow passage spaced downstream from said electrodes,

a fluid pump for supplying a fluid flow along said fluid flow passage from said fluid inlet to said fluid outlet.

20. The apparatus as claimed in claim 19 further including a cooling mechanism for cooling said housing during operation and said cooling mechanism is selected to cool a portion of said housing to a temperature of between about 5°C and 12°C.

21. The apparatus as claimed in claim 19 wherein said voltage is a pulsed AC voltage, said electrodes each comprising a mesh sheet which has been folded or spot welded into a plurality of substantially juxtaposed overlapping layers, and each of said passage segments are delineated from each other by an electrical insulator.

22. The apparatus of claim 1, wherein said fluid flow passage comprises a straight-line passage.

23. The apparatus as claimed in claim 20 wherein said fluid flow passage is electrically insulated from said housing by at least one pair of thermally conductive electrically insulating plates, each said plate being disposed along an opposite side of at least one flow passage segment on opposing sides of the electrode positioned therein,

said cooling mechanism including a cooling fluid circulation tube in thermal contact with said pair of thermally conductive plates, whereby during operation said cooling mechanism effects cooling of both sides of the electrode positioned in said at least one flow passage segment.

24. The apparatus as claimed in claim 23 wherein said thermally conductive plates comprise ceramic plates.